

REMARKS

Independent Claims 11 and 17 of the present application recite a heat-transport device that has a glass and/or a substrate that is covered with a stable material. The stable material of the present claims serves an important purpose; namely, *inter alia* to separate a refrigerant from the substrate and/or the glass that would otherwise be in contact with the refrigerant. By protecting the refrigerant from direct contact with the glass, Applicants have found a way to avoid the diffusion of alkaline components from the substrate into the refrigerant.

The specification discloses that the diffusion of alkaline materials into the refrigerant leads to decomposition of the refrigerant and the formation of, for example, hydrogen gas. The thus-formed gas may cause the pressure to rise in the heat-transport device thereby leading to cracking of the device and the escape of the refrigerant rendering the heat-transport device inoperable.

The Office asserts that the presently claimed invention is obvious in view of a patent to Newton (U.S. 6,437,981) in combination with a published application to Hayashi (U.S. 2002/0086167).

In summary, Applicants traverse the rejection on at least the following three grounds: (1) the Office's improper use of hindsight to recreate the claimed invention; (2) the Office's failure to give patentable weight to the inventor's discovery of source of the problem leading to the failure of heat-transport devices, and (3) the fact that Hayashi and Newton are in different (e.g., non-analogous) arts.

Although the Office recognizes that Newton does not disclose one of the present claim limitations (i.e., the presence of a stable material on the surface of a heat-transport device in contact with a refrigerant); the Office asserts that it would be obvious to modify Newton to include a stable material because Hayashi discloses a stable material.

Applicants remind the Office that in order to establish a *prima facie* case of obviousness, the burden is on the Office to point out some suggestion or motivation to combine the disclosures of different references (MPEP § 2142). As stated in the MPEP:

“The initial burden is on the Examiner to provide some suggestion of the desirability of doing what the inventor has done. “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references” (citations omitted).

When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper.”

In the rejection of the present claims as obvious in view of Newton in combination with Hayashi, the Office supports the combination of the prior art as follows:

“Given the teachings of Hayashi, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the thermally enhanced microcircuit package of Newton with a glass and/or substrate being covered with a stable material; the stable material is selected from the group consisting of SiO₂, SiN, SiC and combination thereof; and the wick being covered with a stable material.

Doing so would provide a protective barrier and improved stably stability of the heat-dissipating device. (See page 3 of the Office Action).”

Applicants submit that the Office did not provide a sufficient basis for asserting that it would be obvious to combine Hayashi, and Newton. The Office merely stated that combining the references would “provide a protective a barrier and improved thermostability”. The Office did not demonstrate that the prior art teaches any need of such protection or any recognition of the underlying problem of refrigerant decomposition.

Applicants submit that in fact those of skill in the art would not turn to Hayashi as a teaching of a non-alkaline substrate and/or glass. As Applicants discussed in the response filed on August 2, 2005, the present application discloses that Applicants discovered that the

source of heat-transport failures is related to the decomposition of the refrigerant caused by the diffusion of an alkaline component from the substrate into the refrigerant. It appears that the Office did not recognize that the “stable material” of Hayashi inherently includes an alkaline component. For example, the film of Hayashi is prepared by hydrolyzing a particular composition “in the presence of a specific amount of an alkaline compound” (see paragraph [0019]; [0040] – [0042] and the examples of Hayashi). As Applicants disclose in the present specification, the diffusion of an alkaline component from a substrate into a refrigerant leads to the decomposition of the refrigerant and the formation of hydrogen gas which causes pressure to build in heat-transport devices.

Applicants submit that the Office’s reliance on Hayashi to reject the present claims as obvious makes no sense because the compositions of Hayashi are inherently formed in the presence of an alkaline component. For example, Hayashi describes mixing materials such as water, ethanol, methyltrimethoxysilane, and tetraethoxysilane with an aqueous methylamine solution (see paragraph [0141]). The compositions thereby formed necessarily contain an alkaline component (i.e., methylamine solution). Regardless that the method of Hayashi may form materials such as SiO₂, a heat transport device containing an alkaline component such as the alkaline components of Hayashi is directly contradictory to Applicants’ teachings with respect to avoiding the decomposition of the refrigerant. Thus, Hayashi teaches away from the claimed invention and the combination of Hayashi and Newton is not suggested in the prior art.

Applicants draw the Office’s attention to new dependent Claim 36 wherein the stable material is formed by chemical vapor deposition. Applicants submit that the subject matter of dependent Claim 36 is further patentable over the prior art of record because the prior art does not disclose forming a stable material on a substrate via chemical vapor deposition or ion implantation.

MPEP 2151.02 (citing *In re Spinnoble*, 160 USPQ 237 (CCPA)) makes clear that discovering the source/cause of a problem must be considered in determining the obviousness of an invention: “a patentable invention may lie in the discovery of the source of the problem even though the remedy may be obvious once the source of the problem is identified”.

Importantly, neither of Newton or Hayashi makes any reference to the decomposition of a refrigerant in contact with a substrate due to the diffusion of an alkaline component from the substrate into the refrigerant. The cited prior art does not recognize that diffusion from a substrate may be stopped by placing a stable material on the substrate. Hayashi discloses only that certain properties such as dielectric characteristics, cracking resistance, evenness and surface hardness may be improved by placing the prior art film on a substrate. Hayashi does not recognize that the diffusion of an alkaline component from a substrate may be halted or interrupted by the presence of a stable material. As was discussed above, the film of Hayashi inherently includes an alkaline component which the inventors of the present application have disclosed is the cause of a significant problem in heat-transport devices.

Thus, the Office has failed to give patentable weight to Applicants’ recognition and disclosure of the cause and solution of refrigerant decomposition in heat transport devices. The rejection should therefore be withdrawn.

Moreover, Applicants further submit that those of ordinary skill in the art would have no basis for combining Hayashi and Newton because the prior art publications are in different (e.g., non-analogous) arts. Newton is drawn to a thermally enhanced microcircuit package whereas Hayashi is drawn to a composition for film formation (see the respective titles). Hayashi describes the formation of insulating films for semiconductor devices (see Abstract such as the devices disclosed in paragraph [0124]).

The cited prior art is in different fields as evidenced by the U.S. PTO patent classifications and the general nature of the subject matter. The combination of Hayashi and Newton is thus improper and the rejection should be withdrawn.

Applicants thus submit that the subject matter of previously presented Claims 11-35 remains patentable over the prior art of record. Applicants further submit that the subject matter of new dependent Claim 36 is further patentable over the prior art. Applicants respectfully request the withdrawal of the rejections and the allowance of all now-pending claims.

Respectfully submitted,

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